

Communications Functional Programs

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C01–Voice Switching and Control System (VSCS)

Program Description: This program provides a voice communications system that performs the intercom, interphone, and air/ground voice connectivity and control functions needed for air traffic control (ATC) operations in an air route traffic control center (ARTCC). The system satisfies the voice communications reconfiguration, service, quality, and availability needs of ARTCC users. It reduces leased costs, increases modularity and growth capability, and increases controller productivity over current communications.

The program uses computer-controlled technology adapted to meet FAA requirements. The contractor has designed controller position equipment that is compatible with the computer-human interface (CHI) used today in ARTCC and terminal radar approach control (TRACON) facilities. The controller position equipment is compatible with the CHI of the Display System Replacement (DSR, part of A01) and other en route automation programs. The DSR contractor will position the voice communications equipment and display devices in consoles to best fit the total CHI and console design. The system is a set of reconfiguration maps to speed facility configuration changes to match traffic, workloads, and equipment outages.

The VSCS Training and Backup Switch (VTABS) is a scaled-down model of the VSCS switch used to provide training and backup at the centers. The VTABS, when switched to backup, can function as a 50-position switch. A capability has been provided to modify or create new reconfiguration maps from designated system supervisory positions.

Commercial VSCS system components that have reached the end of their service lives and cannot be economically supported will be replaced.

Products:

- Voice Switching and Control System
 - One system for the William J. Hughes Technical Center (WJHTC) and one for the FAA Academy
 - One system for each of the 20 ARTCC's and one for the Anchorage Center
- 23 VSCS Training and Backup Switches (VTABS)
- VSCS Emergency Access Radio System (VEARS).

Accomplishments (1/97–9/98):

- Commissioned VSCS at final two ARTCC's (Indianapolis, Ind., and Jacksonville, Fla.)
- Authorized 23 VTABS
- Completed VTABS factory acceptance testing
- Accepted VTABS at the WJHTC
- Completed commissioning of VCSC Emergency Access to Radio System at all ARTCC's
- Delivered second VSCS software preplanned product improvement (P³I)
- Completed VTABS first initial operating capability (IOC) in June 1998
- Completed decommissioning of all WECO-300 and four-channel radio equipment.

Sponsor Organization:

- ATS-1, Air Traffic Services.

Performing Organization:

- AUA-250, IPT for En Route Air Traffic Systems Development.

Contractors:

- Harris Corporation
Melbourne, Fla.

Schedule: C01 - Voice Switching and Control System (VSCS)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
	• Contract Award			VSCS															
				• First ORD - Seattle															
						• Last ORD - Jacksonville													
							VTABS												
							• First ORD												
								• Last ORD											

C04—Radio Control Equipment (RCE)

Program Description: RCE is a critical component of the air/ground communications link, used to provide voice communications between an air traffic control (ATC) facility and aircraft. The FAA's RCE has a severe supportability problem. The equipment is composed of three generations of technology acquired in a piecemeal manner, none of which is centrally supported at the depot level. Replacement parts are obtained by cannibalizing decommissioned RCE.

This program will replace existing RCE with new equipment that incorporates remote maintenance monitoring, switching, and reconfiguration functions.

The program provides a contract vehicle for centralized equipment acquisition and provides centralized logistics support. The RCE contract is administered at the national level with deliveries to air route traffic control center (ARTCC), terminal radar approach control (TRACON), airport traffic control tower (ATCT), and automated flight service station (AFSS) facilities.

Products:

- Approximately 6,600 channels, each consisting of one control unit and one remote unit

- Approximately 150 centralized maintenance systems
- Approximately 1,000 portable maintenance data terminals
- 10-year equipment warranty.

Accomplishments (1/97–9/98):

- Delivered 1,018 RCE channels to 16 ARTCC's
- Delivered 1,578 RCE channels to 43 AFSS's
- Delivered 367 RCE channels to 28 TRACON facilities
- Delivered 280 RCE channels to 54 ATCT's
- Delivered 73 centralized maintenance systems.

Sponsor Organization:

- AAF-1, Airway Facilities Service.

Performing Organization:

- AND-340, Voice and Data Communications Team, IPT for Communications.

Contractors:

- Communications Systems Technology
Columbia, Md.

Schedule: C04 - Radio Control Equipment (RCE)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
	• MNS 093 Approved		• Contract Award																
				• First ORD (Los Angeles)															
					• Second Contract Award														
										• Last ORD									

C05—Voice Switches

Program Description: The 20- to 30-year-old voice switches at towers and TRACON's are obsolete, exhibit an increasing failure rate, and are expensive to maintain. The electromechanical switches are no longer manufactured and replacement parts have to be cannibalized from decommissioned systems. The analog switches cannot be expanded to meet the increased demand for air traffic communications.

This program will acquire enhanced terminal voice switches (ETVS) and rapid deployment voice switches (RDVS) IIA for air traffic control facilities with more than four air traffic controller positions and small tower voice switches (STVS) for smaller

facilities. The Operational Support Telephone System (OSTS) replaces the administrative telephone system that is lost when electromechanical switches are replaced by STVS or ETVS installations.

The voice switch bypass (VSBP) system provides air traffic controllers emergency access to air/ground radio transmitters and receivers in the event of catastrophic failure of the facility's power or voice switch system.

Products:

- Up to 447 ETVS systems, including DOD requirements

- STVS systems at up to 219 sites, including DOD requirements
- Up to 51 RDVS IIA systems
- OSTVS systems as required.

Accomplishments (1/97–9/98):

- Delivered eight ETVS systems, including four DOD systems
- Delivered 243 STVS's, including DOD
- Delivered 94 VSBP's, including DOD
- Delivered 19 RDVS IIA systems.

Sponsor Organization:

- AAT-1, Air Traffic Service.

Performing Organization:

- AND-320, Voice Switching/Recording Team, IPT for Communications.

Contractors:

- Denro
Rockville, Md.
- Litton
College Park, Md.
- Executone
Fairfax, Va.
- DME
Fort Lauderdale, Fla.

Schedule: C05 - Voice Switches

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
			Small Terminal Voice Switch																
			• Contract Award																
			• First ORD																
							• Last ORD												
			Operational Support Telephone System																
			• Contract Award																
			• First ORD																
							• Last ORD												
							Rapid Deployment Voice Switch IIA												
							• Contract Award												
							• First ORD												
								• Last ORD											
							Voice Switch Bypass												
							• Contract Award												
							• System Delivered to First Site												
										• Last ORD									
			Enhanced Terminal Voice Switch																
			• MNS 095 Approved																
			• KDP-2 Approved																
			• Contract Award																
							• First ORD												
														• Last ORD					
															• Complete Contract				

C06–Communications Facilities Enhancement

Program Description: The FAA's air/ground communication network does not have the performance needed for reliable communications in the congested radio frequency spectrum.

This program will provide new remote communications capabilities and improve air/ground radio communications service for selected sites that have a radio communications problem. It will install ancillary

equipment to improve network performance. This is an interim solution until the next-generation communication system is fielded (see C21). The ancillary equipment will correct site-specific deficiencies like persistent radio frequency interference (RFI) problems and phantom controllers. It will also eliminate crowded antenna conditions and spurious emissions. The program will add air/ground communications frequencies and relocate facilities to improve com-

munications coverage. Equipment is procured under multiple existing contracts.

The program has been expanded to include requirements mandated by public law and Executive order for facility accessibility and structural/nonstructural seismic reinforcement of occupied Federal buildings.

Products:

- Very high frequency (VHF)/ultra high frequency (UHF) transmitters and receivers
- Receiver multicouplers
- Transmitter combiners
- RFI Filters
- Solid-state linear power amplifiers.

Accomplishments (1/97–9/98):

- Procured last order of VHF/UHF transmitters and receivers
- Commenced deployment of receiver multicouplers
- Deployed last transmitter combiner

- Completed Provisioning Conference for receiver multicouplers
- Updated technical instruction books on CM-200 radios to include remote maintenance monitoring (RMM).

Sponsor Organizations:

- AAF-1, Airway Facilities Service
- ASR-100, Spectrum Assignment and Engineering Division, Spectrum Policy and Management.

Performing Organization:

- AND-340, Voice and Data Communications Team, IPT for Communications.

Contractors:

- Motorola Government Electronics Group
Scottsdale, Ariz.
- Sinclair Technologies
Tonawanda, N.Y.
- MuDel Electronics Incorporated
Reston, Va.

Schedule: C06 - Communications Facilities Enhancement

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Transmitters/Receivers <ul style="list-style-type: none"> • Contract Award 																			
			• First Hardware Delivered				• Last Hardware Delivered												
							• Complete Implementation												
RFI Elimination - Linear Power Amplifiers <ul style="list-style-type: none"> • Contract Award • First System Delivered 																			
								• Deliver Last System											
RFI Elimination - Combiner <ul style="list-style-type: none"> • Contract Award • First System Delivered 																			
								• Deliver Last System											
RFI Elimination - Multicoupler <ul style="list-style-type: none"> • Contract Award • First System Delivered • Deliver Last System 																			

C09–Sustaining Backup Emergency Communications (BUEC)

Program Description: Loss of air/ground communications has the severest impact on air traffic control. Lack of reliable radio communications precludes applying any type of aircraft separation or guidance. While fallback to manual procedures is possible during radar failures, the inability to speak with pilots cancels all options for control.

The existing backup emergency communications (BUEC) system was completed in the late 1970's using 1950's technology. The FAA is experiencing severe parts supply problems and rising maintenance costs for BUEC equipment. Since 1992, annual parts costs for the existing system have tripled. In many

cases, replacement parts must be cannibalized from decommissioned systems or remanufactured.

This program provides modern equipment to improve backup communications to meet air traffic control requirements. It replaces the existing BUEC equipment in all 20 air route traffic control centers (ARTCC).

The program procures, integrates, and installs nondevelopmental items such as transmitters, receivers, and ancillary items. The equipment is identical to the system components used in the primary radio network. The advantage to this approach is vastly reduced life-cycle costs through parts commonality. Implementation costs are also reduced because FAA field technicians have already been trained on this equipment. There are no additional design, integration, or installation infrastructure costs associated with this replacement equipment. The new system will have better availability for air traffic controller access because each air traffic control sector will be assigned a dedicated backup radio outlet. The system will totally replace the existing obsolete, unsupportable, backup emergency communications system with solid-state equipment at 20 ARTCC's.

Products:

- Approximately 1,000 integrated backup emergency communications channels
- Very high frequency (VHF)/ultra high frequency (UHF) transmitters and receivers
- Radio control equipment
- Antennas
- Equipment racks.

Accomplishments (1/97–9/98):

- Delivered equipment to Denver, Oakland, Salt Lake City, Kansas City, and Atlanta ARTCC's
- Channels operational at Los Angeles, Seattle, and Boston centers.

Sponsor Organization:

- AAT-1, Air Traffic Service
- AAF-1, Airway Facilities Service.

Performing Organizations:

- AND-340, Voice and Data Communications Team, IPT for Communications.

Contractors:

- ARA Incorporated
Beltsville, Md.

Schedule: C09 - Sustaining Backup Emergency Communications (BUEC)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
	• MNS 018 Approved/KDP-2 Approved				• ARC Approved Rescoped Project														
					• Contract Award														
							• First Site ORD (Los Angeles ARTCC)												
													• Last Site ORD						

C10–Emergency Transceiver Replacement

Program Description: Emergency transceivers provide backup radio communications should the primary system fail. Most emergency transceivers in airport control towers and approach control facilities are obsolete and do not have the minimum performance required for reliable communications in the congested radio frequency spectrum.

This program will replace the existing transceivers with modern units that have 25 kilohertz (kHz) channel spacing. Administered at a national level, the contract calls for deliveries to the FAA Logistics Center. Transceivers are distributed to the regions

based on priorities established during the annual call for budget estimates.

Products:

- Approximately 2,160 modern transceivers, for installation at 350 towers and 150 approach control facilities.

Accomplishments (1/97–9/98):

- Procured 500 dual band very high frequency (VHF)/ultra high frequency (UHF) antennas and 100 high pass filters for unique installations

Schedule: C11 - Data Multiplexing Network (DMN) Continuation

[illegible]

C12–Expansion/Reconfiguration of Low-Density Radio Communications Link (LDRCL)

Program Description: The FAA needs an alternative system to transmit critical radar data and communications among FAA facilities where leased services are not available or cost-effective. The obsolete radar microwave link (RML) communications system previously performed this function. A major portion of RML has been replaced with the radio communications link (RCL). Fully implementing an efficient communications system also included upgrading the network portion of the RML system that connects remote sites to the communications backbone.

This program provides the interfacility communications system with the capability to establish low-density microwave spurs to the RCL backbone system. Low-density radio communications link (LDRCL) equipment provides low- to medium-capacity connectivity between centralized facilities and remote locations.

The program is being implemented in two concurrent phases. Phase 1 replaces selected low-capacity RML systems. Phase 2, funded by the operations appropriation, expands interfacility communications where it was beneficial when compared to leased service or where leased service does not exist. The program uses commercial-off-the-shelf equipment.

Products:

- Phase 1: 33 low-density radio communication link segments

- Phase 2: 100 low-density radio communication link segments
- Upgrade 18 LDRCL systems to 8 gigahertz (GHz) frequency band
- Replace 14 1.8 GHz RML systems with microwave equipment.

Accomplishments (1/97–9/98):

- Converted 90 percent of the 1.8 GHz microwave systems affected by the government spectrum sale to 8 GHz
- Installed 169 LDRCL systems
- Updated LDRCL equipment to include MDR-6000 radios, state-of-the-art monitoring, and switchmode rectifiers.

Sponsor Organization:

- AOP-400, Teleco Network Planning and Engineering Division, NAS Operations.

Performing Organization:

- AND-340, Voice and Data Communications Team, IPT for Communications.

Contractors:

- Alcatel Network Systems
Richardson, Tex.

Schedule: C12 - Expansion/Reconfiguration of LDRCL

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Phase 1 (RML Replacement)																			
<ul style="list-style-type: none"> Contract Award First ORD - Phase 1 								<ul style="list-style-type: none"> Completed Last ORD - Phase 1 											
Phase 2 (New Installations)																			
<ul style="list-style-type: none"> MNS 025 Approval First ORD - Phase 2 																			
										<ul style="list-style-type: none"> Last ORD - Phase 2 									

C14—Critical Telecommunications Support (CTS)

Program Description: NAS interfacility telecommunications network configurations that connect surveillance, weather, and communication sites installed by F&E programs—such as airport traffic control tower/terminal radar approach control (ATCT/TRACON), airport surveillance radar (ASR), air route surveillance radar (ARSR), and radio communication air/ground (RCAG)—undergo continual change.

Ongoing telecommunication network reconfigurations, capacity upgrades, and enhancements to improve reliability and capability are necessary to accommodate new or modified air traffic interface and location requirements to sustain/improve network performance, and to control operating costs. This creates additional local termination and interfacility connectivity requirements. Examples are: relocating or installing new circuits to establish connectivity to new sites or satisfy new sector boundaries, installing new circuits for connectivity diversity, replacing circuits destroyed by natural disaster, and expanding equipment and circuit capabilities to prevent traffic overloading from service growth.

The FAA needs a flexible method to support these regional operational telecommunication changes within the NAS, as requirements can be unanticipated. The program provides local telecommunication planning, engineering, acquisition, installation, site preparation, testing, and verification for four discrete project activities. Regional offices identify requirements by project type for CTS during annual planning activities to support future installations and other planned events. These requirements are evaluated and prioritized at the national level. Funds to support the highest priority projects are transferred to national contracts or to regions for local procurement of project telecommunication hardware, software, and services.

Facility Telecommunication Diversity. Today's leased circuits are carried on extremely high-density trunks, some with a capacity in excess of 20,000 circuits. Documented (through monthly performance reports such as the LINC'S CDRL F08) availability for circuits that connect such major facilities as ARTCC's, Level 4 and 5 ATCT's, and consolidated TRACON's use circuits exceeding 0.99999. These circuits are not the focus of the program. All circuits that do not ride this "backbone" and connect remote communication, navigation, and weather systems to major facilities through a single transmission path are documented to have availability that runs in the 0.997 to 0.988 range. This translates into outages, as there is no alternate path to which to switch services when the circuit fails.

This is the primary focus of the CTS program. Trunk failure can prevent voice and radar data transmission, producing coverage gaps, decreasing safety, and increasing delays and maintenance costs. To minimize outages, a second interfacility connection or “diverse path” and A/B switch technology is installed. The CTS program provides leased microwave and terrestrial solutions to add redundancy and increase availability.

Telecommunication Circuit Adds, Moves, and Changes. This project provides the FAA with the ability to transition telecommunication systems and equipment at existing facilities to support new air traffic sector boundaries, increased bandwidth demands between facilities, facility relocations, and the introduction of new navigation, weather, and communication services/facilities onto existing networks. Activities include circuit consolidations to reduce operating costs and improve performance, relocation of circuits, circuit removal, and expansions.

Though this project is discrete, interdependencies can sometimes exist with the other three projects in this program. This project provides the telecommunication terminating equipment enhancements that are sometimes necessary to implement diversity solutions or reconfigure network circuits. The project provides expansions or consolidations of Demarc equipment, technological refreshment of switching and terminating equipment in support of obsolete equipment replacement, transition from analog to digital services, and transition from copper to fiber-optic connectivity.

Products:

- Leased Interfacility Network Communications (LINCS) contract providing Winstar microwave systems, and MCI B-plus node services for facility diversity
- Regional Tellabs equipment procurements.

- Installed LINC S B-plus nodes at Houston ASR-9, Tucson RCAG, and Rochester TRACON
- Installed LINC S Winstar system at Midland TRACON and Waco TRACON
- Established diverse communication path between Denver RCAG and Denver ARTCC
- Restored BUEC systems at Ashton ARSR and VOR monitoring at Idaho Falls after a heavy ice and snowstorm collapsed the antenna
- Installed Tellabs equipment at Edwards AFB TRACON
- Installed and terminated Large Demarcs at El Paso, Albuquerque, Amarillo, and Lafayette ATCT's.

- AAF-1, Airway Facilities Service.

- AOP-400, Telecommunications Network and Planning Engineering Division, NAS Operations.

- Determined regionally. National program support is RMS Information Systems.

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	
							Continuing Effort													
							<ul style="list-style-type: none"> Begin Post FTS 2000 Implementation Engineering Complete Post FTS 2000 Implementation Engineering Begin Post LINCS Implementation Engineering Complete Post LINCS Implementation Engineering 													

Program Description: The FAA needs reliable telecommunications circuits to transmit critical air traffic control data and voice communications. Currently, the FAA has both leased and owned terrestrial facility-to-facility telecommunications for operational requirements. However, these terrestrial telecommunications circuits do not provide the required level of circuit availability and reliability to all FAA locations, particularly remote sites. Communications requirements analysis through 2005 concluded the FAA needs a cost-effective alternative to meet circuit

The FAA Telecommunications Satellite (FAATSAT) provides the FAA with a leased satellite interfacility communications network for the continental United States, Puerto Rico, Hawaii, and the Virgin Islands. The network supports the FAA strategy for cost-effective interfacility communications transmission by providing an alternative path for primary telecommunications circuits that avoid single points of failure through circuit diversity. The network will also meet NAS service availability and message quality re-

quirements. FAATSAT is also necessary for such projects as the Weather and Radar Processor and Integrated Terminal Weather System programs that require large bandwidth, high-capacity transmission capabilities.

A competitive, national requirements-type contract was awarded to procure the services needed at locations to be specified. FAATSAT provides the contract vehicle and completes operational test and evaluation. The contract includes system design, site preparation, installation, operation, and maintenance. The vendor will provide network management and control and keep the FAA informed of system status.

This program has transitioned to the Inservice Management phase of the acquisition management system (AMS) life cycle. It will be deleted from the next CIP.

Products:

- Contract providing telecommunication services to approximately 200 FAA facilities
- Nationwide network management and control
- Transportable earth stations for temporary service requirements and disaster recovery.

Accomplishments (1/97–9/98):

- Completed site preparation for 77 earth station installations

- Completed installation and operational testing and evaluation (OT&E) at seven sites
- Obtained approval to connect to air route traffic control center (ARTCC) critical power (NAS Change Proposal (NCP) 20078)
- Completed Inservice Review and received permission to commission
- Accepted 20 earth stations and 56 remote earth stations from MCI; current service includes 90 circuits
- Completed equipment installation and acceptance for 10 operational sites
- Completed site surveys for 36 of 37 Build 2 sites, including 5 offshore sites that contain RCAG facilities on oil drilling platforms.

Sponsor Organization:

- AAT-1, Air Traffic Service.

Performing Organization:

- AOP-500, Telecommunications Leased Communications Program Division, NAS Operations.

Contractors:

- MCI Telecommunications Corporation
McLean, Va.

Schedule: C15 - FAA Telecommunications Satellite (FAATSAT)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
			• MNS 244 Approved		• Contract Award			• Network Infrastructure Complete			• Base Contract Ends				• Option Period Ends				

C17–Establish Alaskan NAS Interfacility Communications System (ANICS) Satellite Network

Program Description: The FAA needs reliable telecommunications circuits for interfacility communications in Alaska. These circuits must support critical air traffic control services as well as remote maintenance monitoring and other routine operational communications. Unlike in the lower 48 states, the commercial telecommunications infrastructure is insufficient to satisfy FAA requirements.

This project supports the FAA strategy for cost-effective interfacility communication transmission and

fulfills the requirements of FAA Order 6000.36, Communications Diversity. It provides redundant alternative routes, and avoids single points of failure through circuit diversity to meet NAS service availability and message-quality requirements in the expanding air traffic control environment. The system parallels the radio communications link system and the leased NAS interfacility communications system functions that were not implemented in Alaska due to geographical considerations.

communicate with the national command authority. Phase 2 acquires very high frequency/frequency modulation (VHF/FM) radios that incorporate 12.5 kilohertz (kHz) spacing, for use by accident investigators, airway facilities maintenance technicians, aviation security personnel, and local FAA managers.

Products:

- 20 HF/SSB radio upgrades
- 2,500 VHF/FM hand-held transceivers
- 500 VHF/FM mobile transceivers
- 700 VHF/FM repeaters
- 200 VHF/FM base stations.

Accomplishments (1/97–9/98):

- Completed HF/SSB upgrade installations at the FAA headquarters; Elkins, W.Va.; and Anchorage, Alaska

- Completed 29 American Superconductor Corporation (AMSC) satellite telephone system installations at 19 FAA facilities.

Sponsor Organizations:

- ARS-1, Air Traffic System Requirements Service
- ADA-20, Emergency Operations Staff.

Performing Organization:

- AND-340, Voice and Data Communications Team, IPT for Communications.

Contractors:

- Eastern Computers, Incorporated
Virginia Beach, Va.

Schedule: C18 - NAS Recovery Communication (RCOM)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
Phase 1 - HF Upgrade																			
		• MNS 123 Approved			• Contract Award														
					• First Site ORD														
									• Last Site ORD										
		Phase 2 - VHF/FM Radios																	
		• MNS 123 Approved																	
						• Released RFP (Cancelled)													
						• Released Screening Information Request													
						• Contract Award													
						• Begin Deliveries													
																• End Deliveries			

C20–Aeronautical Data Link (ADL)

Program Description: The FAA recognizes that the existing controller-pilot voice radio communications system is approaching the saturation point in many locations. These systems use 1950's technology that must be supplemented or replaced in the near future. Responding to this need, the agency established a data link program office to provide an alternative communications link between controllers and pilots.

Aeronautical data link (ADL) enables digital data communications between air traffic controllers and pilots (and their airborne automation systems). ADL allows access to information previously unavailable in the cockpit and increases the reliability and efficiency of communications between pilots and air-space managers. ADL requires both software (commercial-off-the-shelf (COTS), nondevelopmental

item (NDI) and developmental) and hardware (COTS, NDI) as part of the NAS ground infrastructure. Because the functional requirements vary in complexity, data link comprises distinct components that include: controller-pilot data link communication (CPDLC) builds; host interface device/NAS local area network (HID/NAS LAN); tower data link services (TDLS); flight information services (FIS); and decision support system services (DSSS).

At air route traffic control center (ARTCC) facilities, CPDLC interfaces, via the HID/NAS LAN, with the Host computer system and the controller display. En route CPDLC enables digital data communications exchange between air traffic controllers and pilots and will significantly alter the way air traffic is managed from pre-departure through landing. Standard

clearances and repetitive messages can be sent using simplified CPDLC messages, thereby reducing ground delays for departing aircraft. Additionally, CPDLC alleviates voice frequency congestion, which will make the voice radio constantly available for time-critical delivery and reduce delays. CPDLC will improve flight safety and efficiency, support improvements in airspace use and capacity, and potentially save the aviation industry billions of dollars.

The FAA's goal is to provide a full CPDLC application in en route airspace by 2005. The FAA will develop CPDLC in four phases: CPDLC Build 1, Build 1A, Build 2, and Build 3. Each CPDLC build will support additional messages and capabilities as well as comply with the applicable International Civil Aviation Organization (ICAO) aeronautical telecommunications network (ATN) standards and recommended practices (SARPs). CPDLC Build 1 (key site) will include four ATN-compliant operational messages and is estimated to begin IOC in June 2002. CPDLC Build 1A (national deployment) will increase en route CPDLC service to approximately 18 ATN-compliant operational messages. The Build 1A key site IOC is estimated to be in June 2003. National deployment at all 20 domestic ARTCC's will begin in January 2004, and installation will be complete in December 2004. Additional investment decisions are required prior to beginning Builds 2 and 3, which will implement domestic and international CPDLC and will include approximately 114 operational messages.

In the terminal environment, CPDLC will be integrated into the standard terminal automation replacement system (STARS) platform.

In the tower environment, data link currently provides services such as pre-departure clearance (PDC), digital automatic terminal information service (D-ATIS) with automatic voice generation (AVG), and flight data input/output (FDIO) via an existing service provider.

Data link will also be used for FIS, including transmission of graphic weather service (GWS) text and graphics information, transmission of terminal weather information for pilots (TWIP) through ARINC's aircraft communications addressing and reporting system (ACARS) very high frequency (VHF) data link, and transmission of traffic information service (TIS) through the Mode S data link capability. GWS will capitalize on existing investment and infrastructure and will provide initial FIS data link (FISDL) service through Government-Industry

Project Performance Agreements (G-IPPA) and will transition to the FAA next-generation communications air-ground communications (NEXCOM) data link when available and appropriate. TWIP provides text and character graphic messages of hazardous weather conditions in the terminal area based on products derived from the terminal Doppler weather radar (TDWR), the integrated terminal weather system (ITWS), and the planned ASR-9-weather systems processor (WSP). TIS provides cockpit displays of surrounding aircraft within coverage of all operational Mode S radars to suitably equipped aircraft. Expanded TIS coverage (i.e., communications range and alerting volume) is under review but is dependent on an unfunded upgrade to the Mode S radar system.

ADL enhances safety by:

- Improving access to voice communications for safety-critical transmissions due to reduced frequency congestion arising from use of data link for noncritical communications
- Reducing voice communications errors arising from frequency congestion and technical shortcomings (i.e., pilot readback errors, signal degradation, and "stuck mike")
- Improving pilot access to weather information
- Integrating airborne flight management system capabilities with ground-based decision support automation
- Enabling two-way air-ground functionality for center TRACON automation system (CTAS), user request evaluation tool (URET), and user automation.

Decision Support System Services. DSSS allows pilots to plan more optimal flight paths and to adhere more closely to controller-approved flight paths by providing wind and air temperature information via data link. This service will also provide controller tools with more accurate information on flight paths using data obtained via data link from aircraft about their location, speed, direction, intended flight paths, and performance characteristics.

This concept is being evaluated by the ADL Program Office and industry through the three dimensional user-preferred trajectories flight trials project. Since February 1998, revenue aircraft have been flying user-preferred lateral routes and altitudes, including climbs and descents, from west coast cities during overnight hours where traffic density is low. The goal is to establish a baseline of fuel and time savings as-

sociated with the concept, along with a qualitative analysis of impact on the ATC portion of the NAS. The data link requirements that will enable this and other future concepts have been outlined in the FMS-ATM Next Generation (FANG) Required Functional Capabilities document. This document, published in November 1998 by the ADL Product Team, is the result of a government/industry consortium.

Products:

- TDLS for PDC and D-ATIS at 57 major airports
- HID/NAS LAN installed at all 20 ARTCC's
- Traffic information service (TIS) installed at all Mode S sensor sites
- Terminal weather information for pilots (TWIP) services at 40 TDWR sites
- GWS installed by industry through G-IPPA's providing operational coverage throughout the continental United States (CONUS), Alaska, and Hawaii (FISDL testbed facilities (VDL-2 and -3) will be established at the WJHTC.)
- CPDLC I (ATN) at Miami Center
- CPDLC IA (ATN) at all 20 ARTCC's
- CPDLC II (ATN) at all 20 ARTCC's.

Accomplishments (1/97–9/98):

- HID/NAS LAN
 - Awarded hardware contract
 - Completed software development and operational test and evaluation (OT&E)
 - Obtained approval for prime item product specification (PIPS) NAS change proposal (NCP)
 - Deployed to 14 sites: WHJTC, FAA Aero-Center, Denver Center, and Dallas-Ft. Worth Center
 - Completed contractor acceptance inspection (CAI) at 14 sites: WHJTC, FAAAC, and Denver Center
 - Obtained inservice decision (ISD)
 - Completed operational readiness demonstration (ORD) joint acceptance inspection (JAI) at two sites
 - Completed 50 percent implementation and documentation of Y2K certification
 - Obtained approval for Space NCP
 - Obtained approval for Power NCP
 - Obtained approval for Baseline System NCP

- Continued deployment to nine additional sites
- Completed CAI at 10 sites
- Completed year-2000 certification testing
- TDLS
 - Completed D-ATIS installation at all 57 sites
 - Completed D-ATIS software upgrade and began installation at TDLS sites
 - Released request for proposal (RFP) for D-ATIS upgrade and additional sponsor requirements
 - Begin installation of replacement x-terminals
 - Transitioned maintenance from ARINC to FAA
- GWS/FISDL
 - Published FAA Airborne FIS Policy Statement
 - Drafted FISDL Requirements Document
 - Issued RFI for industry comments on GWS/FISDL implementation
- TWIP
 - Integrated TWIP capability into software baseline at all operational TDWR sites
- TIS
 - Integrated TIS capability into software baseline at all operational Mode S sites
- CPDLC:
 - Completed CPDLC I (ACARS) operational concept
 - Completed CPDLC I (ACARS) functional specification
 - Released RFP for CPDLC I (ACARS) software development
 - Awarded CPDLC I (ACARS) software development task
 - Completed display system replacement (DSR)/CPDLC I keyboard evaluation
 - Began CPDLC I (ACARS) software development
 - Awarded contracts for Aeronautical Telecommunications Network System Incorporated (ATNSI) router reference implementation (RRI) and conformance test suite (CTS) contracts

C21–Next-Generation Air/Ground Communications System (NEXCOM)

Program Description: The FAA requires air/ground radio communications for air traffic control. Very high frequency (VHF) and ultra high frequency (UHF) air/ground radio communication links support all phases of flight.

NOTE: Military aircraft use only UHF frequencies for tactical communications.

The current voice system lacks the channel capacity for near-term air traffic control voice communication demands. Three major problem areas are:

- Accommodating the increasing numbers of channels associated with new sectors and services within the limited radio spectrum bandwidth
- Accommodating the need for integrated data link communications capability to all classes of users (including general aviation)
- Addressing air/ground radio frequency interference and communications security to identify unauthorized users.

Domestic passenger enplanements are forecast to grow by about 4 percent per year through 2002 and beyond. Left unchanged, the existing air/ground radio communications system will approach its limits to support this growth in air traffic capacity by 2005; sooner in certain high-traffic density areas like metropolitan Atlanta, New York, Chicago, and Los Angeles.

The air/ground communications system capacity must be expanded to support any additional sectors (channels) and services. Deficiencies in the existing communications system include:

- Lack of available channels for voice services
- Lack of support for data link
- Degraded ability to improve NAS safety and efficiency
- Increasing radio frequency interference
- Outdated equipment and infrastructure
- Maintainability and supportability problems with existing radio equipment
- Security problems with unauthorized (phantom controllers) users.

The NEXCOM program will design, implement, and install a new air/ground communications system to address current system deficiencies.

NEXCOM capabilities will:

- Meet future air traffic system requirements
- Be based on International Civil Aviation Organization (ICAO) VHF digital link standards
- Be backward compatible with the current analog radio system, both air and ground
- Include capabilities to minimize circuit blockage, increase security, reduce circuit congestion, and provide automatic circuit management
- Permit rapid failure detection and recovery
- Meet air/ground service availability requirements
- Provide compatible interfaces with voice switches and aeronautical telecommunications network elements at control facilities.

The program will be completed in three phases or segments. Currently, only the first segment has been approved by the Joint Resources Council (JRC).

Segment 1. This project will increase voice channel capacity in the VHF spectrum by providing new multimode, analog, and digital voice radio system equipment.

At first, these radios will be operated in the analog mode, as they are today. As user equipment increases, ground equipment will be switched to the digital voice mode. Switching to digital communications allows some frequencies to be recovered and reused in problem terminal areas.

Segment 2. This project will introduce an integrated data link capability into these same facilities, following deployment of the ground network infrastructure.

Segment 3 and Beyond. This project will deploy multimode radios in low en route and selected high-density terminal airspace (57 tower data link services (TDLS) airports and associated terminal radar approach control (TRACON) facilities) and transition to integrated digital voice and data link in these areas:

- Procure equipment that supports (sustains) the current system and adds the very high frequency digital link-3 (VDL 3) system
- Replace, following completion of the communications facilities expansion (CFE) initial deployment, most of the existing air/ground communications systems, such as radio control equipment (RCE), backup emergency communications (BUEC), and UHF analog radios. NOTE: Com-

munications facility improvements will require a continuing separately funded line item.

The resulting single-digital radio type will be a flexible communications system offering users voice and data capability to match their needs during the transition period and beyond. During the transition, the analog system and the digital system will operate side by side. Spectrum relief will begin with decommissioning of analog channels and their reassignment to the new digital radio system.

Products:

- Multimode digital radios
- Integrated digital voice and data VHF air/ground communications system
- Minimum aviation system performance standards (MASPS) for VHF digital link (VDL) Mode 3
- Standards and recommended practices (SARP) for VDL Mode 3
- Minimum operational performance standards (MOPS).

Accomplishments (1/97–9/98):

- Received mission need statement (MNS) #137 validation approval

- Received July 24, 1997, JRC investment strategy decision
- Received May 5, 1998, JRC investment decision
- Developed:
 - Acquisition program baseline (APB) document (Segment 1)
 - NEXCOM transition plan report
 - NEXCOM maintainability study report
 - NEXCOM spectrum requirements final report
 - NEXCOM alternatives analysis report
 - NEXCOM benefit-cost analysis
 - NEXCOM market survey.

Sponsor Organizations:

- AAT-1, Air Traffic Service
- AAF-1, Airway Facilities Service.

Performing Organization:

- AND-300, Integrated Product Team for Communications.

Contractors:

- N/A.

Schedule: C21 - Next-Generation Air/Ground Communications System (NEXCOM) Segment 1

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
				• MNS 137 Approval			• MNS 137 Validation												
							• JRC Investment Decision/APB Approved												
							• Acquisition Strategy Approval												
								• Screening Information Request (SIR) Release											
								• Contract Award											
												• Inservice Review (Decision)							
												• Initial Operating Capability (IOC) Analog Voice							
												• First Commissioning (Analog Voice)							
													• Initial Operating Capability (Digital Voice) (En Route)						
																• Site Implementation Complete Segment 1			

C22–Gulf of Mexico

Program Description: Line-of-sight limitations prevent land-based radios from providing direct air/ground very high frequency (VHF) radio communications coverage in the Gulf of Mexico flight information region (FIR). As a result, separation standards

cannot be reduced and increasing traffic demand cannot be met.

The solution is to provide a system of land- and water-based radios to complete the communication link in the Gulf FIR. The Gulf of Mexico program

(GOMP) will deploy four VHF extended range network (VERN) land-based radios, two in Mexico and two in the United States. The Mexican sites are located at Cancun and Merida, while the U.S. sites are at Venice, La., and Key West, Fla.

To ensure complete coverage and to complement the land-based coverage, the buoy communications system (BCS) is currently scheduled for deployment after a prototype demonstration validates the concept of operation. VHF radios on each buoy are used to communicate with aircraft and the information is then relayed to the Houston air route traffic control center (ARTCC) via satellite. GOMP will allow reduced aircraft separation, thereby increasing the ability to handle current and projected traffic demand.

Remote maintenance monitoring will be used for both the VERN and BCS, and BCS certification will be accomplished remotely.

Products:

- Four leased VHF extended range sites
- Leased satellite time to support the BCS prototype
- Upgraded southwest and southern region air/ground radios
- Prototype buoy communications system

Schedule: C22 - Gulf of Mexico

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
						<ul style="list-style-type: none"> • Contract Award to ARINC • IA Mod 6 to NDBC <ul style="list-style-type: none"> • Complete VERN Installation and Flight Test • Commission Four VERN Sites • Factory Acceptance Test and Flight Test of Prototype BCS <ul style="list-style-type: none"> • Deploy BCS 													

(Revalidation of Mission Need in Progress)

- Prototype buoy support system.

Accomplishments (1/97–9/98):

- Received Joint Resources Council (JRC) approval for an integrated system using VERN and BCS in lieu of a buoy-only approach
- Awarded leased service to ARINC for four VERN sites
- Signed interagency agreement (IA), Mod 6, with National Data Buoy Center (NDBC) to provide prototype system in lieu of the Harris BCS solution
- Installed and flight-tested the Venice, Fla., upgraded radio.

Sponsor Organization:

- AAT-1, Air Traffic Service.

Performing Organization:

- AND-340, Voice and Data Communications Team, IPT for Communications.

Contractors:

- Harris Corporation
Melbourne, Fla.
- National Data Buoy Center
Stennis, Miss.

C23–Voice Recorder Replacement Program (VRRP)

Program Description: The FAA is required to record all air traffic controller voice communications. This includes communications between controllers and pilots and between controllers and other air traffic control facilities. The number of voice channels recorded varies from 10 at smaller facilities to over 300 at large air route traffic control center (ARTCC) facilities. The FAA currently employs six different analog, reel-to-reel voice recording systems. These systems are technologically obsolete and logistically unsupportable.

VRRP will acquire and install commercially available voice recording equipment. The program has three phases. Phase 1 was funded by CIP program C02 (now completed) and provided digital voice recorders to approximately 100 radar facilities. Phase 2 will provide digital voice recorders to approximately 455 terminal radar approach control (TRACON) facilities, airport traffic control towers (ATCT), automated flight service stations (AFSS), and selected flight service stations (FSS). Phase 3 will provide

- Delivered 94 DVRs's in 1998, including 28 DOD systems.

Sponsor Organization:

- AAF-1, Airway Facilities Service.

- AND-320, Voice Switching/Recording Team, IPT for Communications.

Contractors:

- Denro
Gaithersburg, Md.

[illegible]

Program Description: The FAA has air traffic management responsibilities for four international flight information regions. To satisfy these responsibilities, the FAA must be able to communicate with aircraft operating in these regions. The primary deficiency of the current communication system is the length of time required to transmit or receive messages. This deficiency will limit the FAA's ability to accommodate the expected increase in international air traffic.

members of the aeronautical community. This program is still in the planning stage and not yet funded.

- Alternative analyses
- Leased data link communication services.

- Program inactive.

- AAF-1, Airway Facilities Service
- AAT-1, Air Traffic Service.

- AOP-500, Teleco Leased Communications Program Division, NAS Operations.

- To be determined.

Schedule: C24 - FAA Skylinks

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10

C25—Automated Flight Service Stations Voice Switches (AFSSVS)

Program Description: Operational efficiency of an Automated Flight Service Station (AFSS), and thus the very accomplishment of its mission, depends on the capability and reliability of its communication system. Reliable air/ground (A/G) and ground/ground (G/G) voice communications are therefore critical to the services that AFSS's provide to NAS users. The existing Type III Integrated Communications Switching System (ICSS) will reach the end of its planned life cycle in 2002.

The AFSSVS program objective is to provide the aviation community with significantly improved access to flight planning, weather, communication, and emergency services essential to safe and efficient flight. The AFSS's service about 35 million contacts annually, and the AFSS voice switch serves as a principal interface between the flight service specialist and the pilot.

The AFSSVS project will sustain the voice-switching capability in AFSS's through the next decade, while providing for needed sustainment, performance, and capability enhancements. Performance enhancements include, but are not limited to, increased reliability, maintainability, supportability, and scalability, as well as the capability to electronically reconfigure the system and offload frequencies. This project will provide a capability that replaces the existing Type III ICSS's fielded in the 1980's. A total of 64 systems, including engineering and training systems, are planned for replacement.

The procurement will be conducted in two steps. Step 1 will satisfy 31 Litton Type III, Phase 1 system replacement requirements, and Step 2 will satisfy 33 Denro Type III, Phase 1/1A system replacement requirements.

Products:

- Replacement of existing Type III ICSS at 61 AFSS sites in the continental United States, the FAA Academy, the William J. Hughes Technical Center, and the Operational Support Service (AOS)
- An AFSSVS for each Model 1 Full Capacity (M1FC) terminal (or planned Operational and Supportability Implementation System (OASIS) placement).

Accomplishments (1/97–9/98):

- Received JRC approval of MNS 320
- Developed AFSSVS Requirement Document.

Sponsor Organization:

- ARS-1, Air Traffic System Requirements Service.

Performing Organization:

- AND-320, Voice Switching and Recording Team, IPT for Communications.

Contractors:

- To be determined.

Schedule: C25 - Automated Flight Service Stations Voice Switches (AFSSVS)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10

C26–FAA Integrated Communications System for the 21st Century (FICS-21)

Program Description: Telecommunications systems and services, which support every element of the NAS, are critical to the FAA's mission. The systems are necessary to provide ATS services and to manage, monitor, maintain, and control the NAS.

Required telecommunications services are provided through owned and leased telecommunications systems. Several key systems leases will expire beginning in January 2002. Other leases will begin to expire shortly thereafter, and most owned assets will be well beyond the end of their useful lives. (See programs C11 through C17 for leased program expiration dates.) The service life of FAA-owned systems is estimated at 10 years.

The FAA Integrated Communications System for the 21st Century (FICS-21) will provide a reliable, efficient, and cost-effective means to provide continuous service as existing leases expire and owned systems are retired. Expected benefits of FICS-21 include:

- Communications architecture consistent with NAS Architecture sequence of capabilities
- Flexible, responsive, cost-effective service to meet all known and projected FAA requirements
- Improved system performance
- Compliance with Government Performance and Results Act (GPRA), Information Technology Management and Reform Act (ITMRA), and related legislation.

The FICS-21 program is in its early stage. The Mission Need Statement (MNS-322) has been approved by the JRC. A Program Office has been established within the Telecommunications Integrated Product Team (TIPT) to plan and manage the FICS-21 program. Efforts have been initiated to develop and document the administrative, technical, performance, security, management, and operational system require-

ments. Other efforts have begun to define transition and implementation issues; develop a concept of operations; and investigate the applicability of such services as the Federal Telecommunications Service (FTS), Defense Information Systems Network (DISN), and other agencies' contract vehicles in satisfying the FAA future telecommunications requirements. Discussions are underway regarding an acquisition strategy. A formal investment analysis is underway and is expected to be completed by January 1999. The Acquisition Program Baseline (APB) is expected to be approved in February 1999.

Products:

- High-performance telecommunications services to meet FAA ATC and administrative requirements.

Accomplishments (1/97–9/98):

- Presented a FICS-21 Information Briefing to Industry
- Received JRC approval of Mission Need Statement (MNS-322)
- Developed the Program Management Plan (PMP)
- Developed the Concept of Operations (CONOPS)
- Developed the Initial Requirements Document (IRD)
- Developed Alternative Acquisition Strategies

Sponsor Organization:

- ATS-1, Air Traffic Services.

Performing Organization:

- AOP-500 Telecommunications Integrated Product Team (TIPT).

Schedule: C26 - FAA Integrated Communications System for the 21st Century (FICS-21)

91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10
							• MNS 322 Approved				Pending Investment Analysis								
							• JRC Investment Decision												

New Communication Mission Needs (2001–2004)

New communication plans expected to need funding during the next 5 years include:

- Replacing existing ultra high frequency (UHF) air/ground radios to maintain radio communications compatibility with the DOD
- Providing digital interfaces on all legacy voice switches requiring replacement or technology refresh

- Providing a communications system to support the increase in oceanic air traffic (C24)
- Providing continuing communications support for the Gulf of Mexico program.

Actual requirements will be addressed through the Acquisition Management System.